the southeast, but it soon changed to a northeasterly direction and moved into the adjoining township, where barns were destroyed on three farms. The total loss is estimated at $50,000. No persons were injured.

Seiches.—Violent barometric fluctuations were noted at Grand Haven, Mich., on the 19th and 20th, and seiches were reported along the lake shore and in the river at that place, but exact times and measurements could not be obtained. Similar conditions prevailed at Alpena, Mich., on the 22d and 23d, where fluctuations of water level of from 8 to 15 inches occurred.

Dense fog was reported over the northwestern sections of the district on several days during the first week of the month, and at a number of stations throughout the Lake region during the last decade.

Hail occurred at a few stations, chiefly in the western portions of the district.

MAY, 1912, LAKE LEVELS.

The following data are from the report of the United States Lake Survey Office:

Lakes.	Feet above tidewater, New York.
Superior	602.00
Michigan-Huron	579.93
Erie	572.54
Ontario	246.82

Lake Superior is 0.54 foot higher than last month, 1.18 feet higher than a year ago, 0.07 foot below the average stage for May of the last 10 years, 1.05 feet below the high stage of May, 1861, and 1.18 feet above the low stage of May, 1911. It will probably rise 0.3 foot during June.

Lakes Michigan-Huron are 0.49 foot higher than last month. 0.23 foot higher than a year ago, 0.81 foot below the average stage for May of the last 10 years, 3.59 feet below the high stage of May, 1886, and 0.37 foot above the low stage of May, 1896. They will probably rise 0.3 foot during June.

Lake Erie is 0.29 foot higher than last month, 0.66 foot higher than a year ago, 0.15 foot lower than the average stage for May of the last 10 years, 1.88 feet below the high stage of May, 1862, and 1.23 feet above the low stage of May, 1901. It will probably rise 0.2 foot during June.

Lake Ontario is 0.50 foot higher than last month, 1.22 feet higher than a year ago, 0.12 foot higher than the average stage for May of the last 10 years, 2.13 feet below the high stage of May, 1870, and 1.86 feet above the low stage of May, 1872. It will probably rise 0.1 foot during June.

MAY, 1912, FLOOD IN MICHIGAN.

F. H. Coleman, Acting Section Director.

Grand River.—During the period May 11 to 22, inclusive, rains occurred nearly every day throughout the watershed of Grand River, the precipitation being heaviest in the middle and upper portions. The river rose slowly until the 22d, when it began to rise quite rapidly in the lower stretches as a result of heavy rains during the preceding two days. From Ionia to Grand Rapids the stages were much above normal, but at stations above Ionia the river was only moderately high.

The river service was put in operation May 23, and warnings issued for flood stages at Lowell and Grand Rapids by the night of the 24th or during the 25th. The water continued to rise at Grand Rapids until the morning of the 25th, when the crest of the flood occurred, the highest reading being 10 feet.

The city authorities were notified of the impending high water and put the sewer pumps in operation, so that there was practically no damage from water in the basements subject to flooding at the stage reached.

Saginaw River.—Very heavy precipitation occurred over nearly all the Saginaw watershed from May 11 to 22, inclusive. Some of the amounts that occurred during this period are as follows:

Alma	5.83	Harrison	6.88
Arbela	8.67	Owosso	8.13
East Tawas	9.40	Saginaw	6.86
Gladwin	11.50	Vassar	7.72

The continued precipitation during this period caused a steady but slow rise in all the tributaries of the Saginaw River until the 20th and 21st, when heavy rains caused a much more rapid rise in the Flint and Cass Rivers and torrential downpours over the upper portion of the Tittibawassee started a very alarming rise in that stream.

All gaging stations were notified to begin observations at 6 p. m. May 21, and warnings were at once issued that a river stage at Saginaw as high as that prevailing during April might be expected within the next two days. The water continued to rise at Midland until the night of the 22d, when it reached the highest point ever observed at that place, 22.9 feet. On the 22d warnings were issued to prepare for a 24-foot stage at Saginaw, which would be reached by midnight of the 24th. The crest of the flood passed Saginaw during the 24th, its highest stage being 24 feet.

The greatest damage occurred at Midland and Saginaw and in the territory comprising the watershed of the Tittibawassee River. The rise of this stream was so rapid that many families were compelled to flee from their homes during the night, and in some cases it was necessary to use boats to remove the people from the flood districts. Apparently the heaviest rainfall occurred in the region around Gladwin, at which point 7.20 inches were recorded during the 20th and 21st.

A considerable part of the city of Midland was flooded, and the water was about 8 feet deep at the point where the cooperative observing station is located. At Saginaw many of the basements were flooded and water appeared in the streets in the lower parts of the city. Much of the country surrounding Saginaw and extending down the river to Bay City was overflowed. The interurban line connecting the two cities was compelled to suspend operations for about a week. The railroads throughout the Saginaw district suffered great delay from washouts and in some places the tracks were under water.

There was considerable damage to agricultural interests in the lowlands and a considerable loss of live stock.